Mathematical Biosciences

an international journal

Volume 107 1991

THE BELLMAN PRIZE 1

CLAUDIO COBELLI AND MARIA PIA SACCOMANI (Padova, Italy)
Domain of Validity of Classical Models of Leucine Metabolism Assessed by Compartmental Modeling 3

ALEXANDER D. TSODIKOV AND ANDREJ YU. YAKOVLEV (Leningrad, USSR)
On the Optimal Policies of Cancer Screening 21

J. M. CUSHING (Tucson, Arizona)
A Simple Model of Cannibalism 47

JAMES S. ULTMAN (University Park, Pennsylvania) AND CLAUDE A. PIANTADOSI (Durham, North Carolina)
Differential Pathlength Factor for Diffuse Photon Scattering Through Tissue by a Pulse-Response Method 73

PETER F. STADLER (Vienna, Austria)
Complementary Replication 83

SHIGUI RUAN AND H. I. FREEDMAN (Edmonton, Alberta)
Persistence in Three-Species Food Chain Models with Group Defense 111

ILIAS IAKOVIDIS AND CLYDE F. MARTIN (Lubbock, Texas)
A Model Study of Instability of the Inverse Problem in Electrocardiography 127

Spread of Epidemics: Stochastic Modeling and Data Analysis

Basic Modeling Considerations

JOHAN GIESECKE (Stockholm, Sweden)
Some Remarks on Definition and Validity of Terms Used in Models for Infectious Disease Spread 149

Stochastic and Deterministic Models

UWE RÖSLER (Brake, Germany)
Deterministic in Contrast to Stochastic Modeling 155

JOHN A. JACQUEZ (Ann Arbor, Michigan) AND PHILIP O'NEILL (Nottingham, England)
Reproduction Numbers and Thresholds in Stochastic Epidemic Models I. Homogeneous Populations 161

INGEMAR NÅSELL (Stockholm, Sweden)
On the Quasi-Stationary Distribution of the Ross Malaria Model 187
VALERIE ISHAM (London, England)
Assessing the Variability of Stochastic Epidemics 209

Heterogeneity

PHILIPPE PICARD (Villeurbanne, France) AND
CLAUDE LEFÈVRE (Brussels, Belgium)
The Dimension of Reed-Frost Epidemic Models with
Randomized Susceptibility Levels 225
RICHARD J. KRYSCIO (Lexington, Kentucky) AND
CLAUDE LEFÈVRE (Brussels, Belgium)
Measuring the Severity of Disease Clustering Using Tango's Index 235
A. D. BARBOUR AND MARIA KAFETZAKI (Zürich, Switzerland)
Modeling the Overdispersion of Parasite Loads 249

Spatial Modeling

DENIS MOLLISON (Edinburgh, Scotland)
Dependence of Epidemic and Population Velocities on Basic Parameters 255
MICHAEL LLOYD (Edinburgh, Scotland)
Computer Analysis of the Shape of Spread of Epidemics on a Grid 289
FRANK G. BALL (Nottingham, England)
Dynamic Population Epidemic Models 299

Contact Structure

O. DIEKMANN (Amsterdam, The Netherlands), K. DIETZ (Tübingen, Germany),
AND J. A. P. HEESTERBEEK (Amsterdam, The Netherlands)
The Basic Reproduction Ratio for Sexually Transmitted
Diseases: I. Theoretical Considerations 325
FREDRIK GRANATH, JOHAN GIESECKE, AND
GIANPAOLO SCALIA-TOMBA (Stockholm, Sweden),
AND KRISTINA RAMSTEDT AND LARS FORSSMAN (Gothenburg, Sweden)
Estimation of a Preference Matrix for Women's Choice of
Male Sexual Partner According to Rate of Partner Change,
Using Partner Notification Data 341
MARTINA MORRIS (New York, New York)
A Log-Linear Modeling Framework for Selective Mixing 349
S. P. BLYTHE (Glasgow, Scotland), C. CASTILLO-CHAVEZ (Ithaca, New York),
J. S. PALMER (Madison, South Dakota), AND M. CHENG (Ithaca, New York)
Toward a Unified Theory of Sexual Mixing and Pair Formation 379

Vaccine Strategies

ÅKE SVENSSON (Stockholm, Sweden)
Analyzing Effects of Vaccines 407

Modeling in Relation to AIDS

NORMAN T. J. BAILEY (Lauenen, Switzerland)
The Use of Operational Modeling of HIV/AIDS
in a Systems Approach to Public Health Decision Making 413

L. Billard and Zhen Zhao (Athens, Georgia)
Three-Stage Stochastic Epidemic Model: An Application to AIDS 431
Andrew J. G. Cairns (Edinburgh, Scotland)
Model Fitting and Projection of the AIDS Epidemic 451
Charles J. Mode (Philadelphia, Pennsylvania)
A Stochastic Model for the Development of an
AIDS Epidemic in a Heterosexual Population 491
Carla Rossi (Rome, Italy)
A Stochastic Mover/Stayer Model for an HIV Epidemic 521
Gianpaolo Scalia-Tomba (Rome, Italy)
The Effect of Structural Behavior Change on the
Spread of HIV in a One-Sex Population 547

1991 Author Index 557

1991 Subject Index 559